

WHAT IS CLAIMED IS:

- 1                   1.       A secure passcode authentication system, the system comprising:  
2                   an Access Control Server (ACS) configured to receive a request for passcode  
3 authentication of a Primary Account Number (PAN), and configured to request a passcode  
4 corresponding to the PAN;  
5                   a front end Hardware Security Module (HSM) coupled to the ACS, and  
6 configured to receive the passcode and generate an encrypted passcode using a local encryption  
7 key; and  
8                   a back end HSM configured to receive the encrypted passcode from the front end  
9 HSM and further configured to recover a clear form of the passcode, generate a back end  
10 encrypted passcode, and communicate the back end encrypted passcode to an authentication  
11 network.
- 1                   2.       The system of Claim 1, wherein the request for passcode authentication  
2 comprises a request for a Personal Identification Number (PIN) authentication.
- 1                   3.       The system of Claim 1, wherein the ACS is further configured to receive  
2 an authentication message from the authentication network.
- 1                   4.       The system of Claim 1, wherein the ACS is further configured to generate  
2 a unique transaction identification and include the unique transaction identification as a hidden  
3 field in the request for the passcode.
- 1                   5.       The system of Claim 4, wherein the front end HSM is configured to  
2 generate a hash value based in part on the unique transaction identification, and wherein the ACS  
3 is configured to include the hash value as an additional hidden field in the request for the  
4 passcode.
- 1                   6.       The system of Claim 1, wherein the request for the passcode includes an  
2 instruction to direct the passcode to the front end HSM.
- 1                   7.       The system of Claim 1, wherein the front end HSM comprises a software  
2 HSM.

1                   8.     The system of Claim 1, wherein the front end HSM comprises a hardware  
2 HSM.

1                   9.     The system of Claim 1, wherein the front end HSM is configured to  
2 receive the passcode in a first encrypted format.

1                   10.    The system of Claim 9, wherein the first encrypted format comprises a  
2 Secure Sockets Layer (SSL) encrypted format.

1                   11.    The system of Claim 1, wherein the front end HSM is configured to  
2 receive a cardholder encrypted passcode from the ACS.

1                   12.    The system of Claim 1, wherein the front end HSM is configured to  
2 receive a cardholder encrypted passcode from a cardholder device.

1                   13.    The system of Claim 1, wherein the back end HSM is configured to  
2 generate the back end encrypted passcode by generating a PINBLOCK using the clear form of  
3 the passcode and encrypting the PINBLOCK using an Acquirer Working Key (AWK).

1                   14.    The system of Claim 1, wherein the authentication network comprises an  
2 Internet Payment Gateway Server (IPGS).

1                   15.    The system of Claim 14, wherein the authentication network further  
2 comprises an issuer server coupled to the IPGS.

1                   16.    A secure passcode authentication system, the system comprising:  
2                   an Access Control Server (ACS) configured to receive a request for Personal  
3 Identification Number (PIN) authentication of a Primary Account Number (PAN), and  
4 configured to generate a request for a PIN corresponding to the PAN, the request for the PIN  
5 including hidden fields comprising a unique transaction identifier and a hash value;  
6                   a front end Hardware Security Module (HSM) coupled to the ACS, and  
7 configured to generate the hash value based in part on the unique transaction identifier, and  
8 further configured to receive an encrypted PIN, decrypt the PIN to recover a clear form of the  
9 PIN, and generate a local encrypted PIN using a local encryption key; and

10                   a back end HSM configured to receive the local encrypted PIN from the front end  
11 HSM and further configured to recover a clear form of the PIN from the local encrypted PIN,  
12 generate an Acquirer Working Key (AWK) encrypted PIN, and communicate the AWK  
13 encrypted PIN to an authentication network.

1                   17.     The system of Claim 16, wherein the front end HSM generates the local  
2 encrypted key using a triple DES algorithm.

1                   18.     A secure passcode authentication system, the system comprising:  
2                   an Access Control Server (ACS) configured to receive a request for Personal  
3 Identification Number (PIN) authentication of a Primary Account Number (PAN), and  
4 configured to generate a request for a PIN corresponding to the PAN, the request for the PIN  
5 including an instruction to provide the PIN to a destination address; and  
6                   a front end Hardware Security Module (HSM) having said destination address and  
7 coupled to the ACS, and configured to receive an encrypted PIN, decrypt the PIN to recover a  
8 clear form of the PIN, and generate an Acquirer Working Key (AWK) encrypted PIN using an  
9 AWK encryption key, and configured to communicate the AWK encrypted PIN to an  
10 authentication network.

1                   19.     A method for providing secure passcode authentication, the method  
2 comprising:  
3                   requesting a Personal Identification Number (PIN) corresponding to a Primary  
4 Account Number (PAN);  
5                   receiving the PIN in response to the request;  
6                   generating a PINBLOCK based in part on the PIN;  
7                   encrypting the PINBLOCK using a local key in a front end Hardware Security  
8 Module (HSM) to generate a local key encrypted PINBLOCK;  
9                   decrypting the local key encrypted PINBLOCK with a back end HSM;  
10                   generating a back end encrypted PIN with the back end HSM;  
11                   communicating the back end encrypted PIN to an authentication network; and  
12                   receiving an authentication response from the authentication network.

1                   20.     The method of Claim 19, wherein requesting the PIN comprises:

2                   generating a unique transaction identifier;  
3                   generating a hash value with the front end HSM based in part on the unique  
4 transaction identifier;  
5                   generating a query having the unique transaction identifier and hash value as  
6 fields in the query; and  
7                   communicating the query.

1                   21.     The method of Claim 19, wherein requesting the PIN comprises:  
2                   generating a query having an instruction directing a query response be directed to  
3 a destination address corresponding to the front end HSM; and  
4                   communicating the query over an Internet connection to a cardholder device.

1                   22.     The method of Claim 19, wherein receiving the PIN comprises receiving a  
2 Secure Sockets Layer (SSL) encrypted PIN.

1                   23.     The method of Claim 22, wherein receiving the PIN further comprises  
2 receiving the SSL encrypted PIN at an Access Control Server (ACS).

1                   24.     The method of Claim 22, wherein receiving the PIN further comprises  
2 receiving the SSL encrypted PIN from a cardholder device at the front end HSM.

1                   25.     The method of Claim 19, wherein the front end HSM comprises a  
2 software HSM implementation within an Access Control Server (ACS).

1                   26.     The method of Claim 19, wherein encrypting the PINBLOCK comprises  
2 encrypting the PINBLOCK using a triple DES encryption algorithm.

1                   27.     The method of Claim 19, wherein generating the back end encrypted PIN  
2 comprises:  
3                   generating a back end PINBLOCK from a clear form of the PIN; and  
4                   encrypting the PIN with the back end HSM using an Acquirer Working Key  
5 (AWK).

1                   28.     A method for providing secure passcode authentication, the method  
2 comprising:

3 receiving an encrypted Personal Identification Number (PIN) corresponding to a  
4 Primary Account Number (PAN);  
5 decrypting the encrypted PIN in a front end Hardware Security Module (HSM) to  
6 generate a clear form of the PIN;  
7 generating a PINBLOCK based in part on the clear form of the PIN;  
8 generating in a back end HSM a back end encrypted PIN based in part on the  
9 PINBLOCK;  
10 communicating the back end encrypted PIN to an authentication network; and  
11 receiving an authentication response from the authentication network.

1 29. The method of Claim 28, wherein the front end HSM comprises the back  
2 end HSM.

1 30. The method of Claim 28, wherein receiving the encrypted PIN comprises  
2 receiving a Secure Sockets Layer (SSL) encrypted PIN over an Internet connection from a  
3 cardholder device.

1 31. The method of Claim 28, wherein generating the back end encrypted PIN  
2 comprises generating an Acquirer Working Key (AWK) encrypted PIN.

1 32. A method for providing secure passcode authentication, the method  
2 comprising:  
3 generating encryption data;  
4 querying a cardholder for a Personal Identification Number (PIN) corresponding  
5 to a Primary Account Number (PAN);  
6 receiving an encrypted PIN and at least a portion of the encryption data in  
7 response to the query;  
8 generating a clear form of the PIN based in part on the encrypted PIN;  
9 generating a PINBLOCK based in part on the clear form of the PIN;  
10 encrypting the PINBLOCK in a front end Hardware Security Module (HSM)  
11 using triple DES encryption to generate an encrypted PIN (EPIN);  
12 decrypting the EPIN in a back end HSM to recover the clear form of the PIN;

- 13                    encrypting the clear form of the PIN in the back end HSM using an Acquirer
- 14    Working Key (AWK) to generate an AWK encrypted PIN;
- 15                    communicating the AWK encrypted PIN to an authentication network; and
- 16                    receiving an authentication response.